

Serial No. 10/727,385Docket No. H01541**REMARKS**

Claims 1-20 are pending in the application.

Claim 12 is amended herein to correct the term "pinhole" to "aperture layer", as disclosed, for example, at page 7, line 25 to page 8, line 8.

Applicants respectfully request reconsideration of the application based on the following points.

Rejection of Claims 3 and 12-20 Under 35 U.S.C. §112, Second Paragraph

Claims 3 and 12-20 stand rejected under as being indefinite. Applicants respectfully disagree with and traverse this ground of rejection.

Claim 3 stands rejected as indefinite for its use of "oscillated". Applicants traverse this rejection, since the term "oscillated" is easily understandable by a person of ordinary skill in the art based on the description in the specification from page 10, line 21 to page 11, line 8, describing the function of the diffuser generally, and particularly from page 10, line 26 to page 11, line 3, in which oscillation of the diffuser to homogenize and/or randomize light passing through the device is described. As would be understood from this disclosure, oscillation of the diffuser in a direction perpendicular to the direction of propagation of the light is used to homogenize and/or randomize the light, thereby removing any "information" from it.

Applicants respectfully submit that the term "oscillated" in claim 3 (and in claim 19) is not indefinite. Accordingly, Applicants request this ground of rejection be withdrawn.

Claim 12 is rejected as indefinite for use of the term "pinhole" plate. This claim has been amended to correct this term to "aperture layer" plate, based on the disclosure cited above. Accordingly, Applicants request this ground of rejection be withdrawn.

Claim 17 is rejected as indefinite because the Examiner does not understand "how a pupil intensity distribution with a diffuser is approximately equal to the pupil intensity distribution of $P_{(x,y)}$ projection lens". The claim explicitly defines this relationship, reciting:

"wherein the following relationships are defined:

$$P_{(x,y) \text{ diffuser}} \cong P_{(x,y) \text{ projection lens}} \quad (1)$$

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and

$$P_{(x,y) \text{ diffuser}} / P_{(x,y) \text{ no diffuser}} \cong P_{(x,y) \text{ illumination source}} \quad (2)".$$

(Emphasis added.) That is, these relationships are being set or defined, so that the value $P_{(x,y) \text{ diffuser}}$ is being set or defined as approximately equal to $P_{(x,y) \text{ projection lens}}$. That is, the value determined experimentally for $P_{(x,y) \text{ diffuser}}$ (when the system is operated with the diffuser) is being used to approximate the value of $P_{(x,y) \text{ projection lens}}$, which is not being determined directly, but is being approximated by the value of $P_{(x,y) \text{ diffuser}}$. Then, when the value of $P_{(x,y) \text{ no diffuser}}$ is determined (when the system is operated without a diffuser), the value of $P_{(x,y) \text{ illumination source}}$ can be determined according to equation (2). This relationship is clearly described in the specification; in particular, from page 20, line 13 to page 21, line 16.

Applicants respectfully submit that the terms used in claim 17 are not indefinite. Accordingly, Applicants request this ground of rejection be withdrawn.

For the foregoing reasons, Applicants respectfully request the Examiner to withdraw the rejections of claims 3 and 12-20 as indefinite.

Rejection of Claims over Chuang et al.

Claims 1-11 stand rejected as obvious over U.S. Patent Application Publication No. 2004/0218262, to Chuang et al. Applicants respectfully traverse the rejections of these claims over Chuang et al. for at least the following reasons.

As an initial matter, Applicants note that claims 12-20 are not rejected over Chuang et al. Accordingly, Applicants request that the allowability of these claims be acknowledged by the Examiner.

The Examiner's statement of the rejection is reproduced here for convenience:

Chuang discloses a device for determining projection lens pupil transmission distribution in a photolithographic imaging system comprising an illumination source (121), a transmissive reticle (para 0182), an aperture layer having a plurality of openings (para 0086), a diffuser (para 0086), a

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projection lens system (para 0086) and an image plane and a pupil image corresponding to each of the openings (para 0086).

The Examiner's statement of the rejection fails on its face to state a *prima facie* case of anticipation. Applicants' claimed invention, described by claim 1 as broadest and representative, is as follows:

A device for determining projection lens pupil transmission distribution in a photolithographic imaging system, the device comprising:

- an illumination source;
- a transmissive reticle;
- an aperture layer having an illumination source side and a light emission side and comprising a plurality of openings therethrough;
- a diffuser mounted on the illumination source side of the aperture layer;
- a projection lens system; and
- an image plane,

wherein a pupil image corresponding to each of the plurality of openings in the aperture layer is formed at the image plane when radiation from the illumination source passes through the reticle, the diffuser, the aperture layer and the projection lens system, the pupil image having a projection lens pupil transmission distribution.

Applicants submit that the Examiner failed to identify all of the limitations of this claim in the cited reference. Specifically, the Examiner failed to identify the elements of claim 1 in the order recited in the claim.

The only portions of Chuang et al. cited and relied upon by the Examiner are paragraphs [0086] and [0182].

Paragraph [0182] is referred to by the Examiner with respect to the reticle. However, [0182] contains nothing at all about a reticle. In fact, the term "reticle" does not appear at any point in Chuang et al. The Examiner failed to identify any structure in Chuang et al. that would correspond to, and be recognized as corresponding to, the claimed reticle. Thus, for this reason alone, Applicants submit that the Examiner has failed

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to state a *prima facie* case of anticipation, since one of the claimed elements appears to be wholly missing from the reference, and the Examiner failed to identify this element.

Accordingly, Applicants request the Examiner to withdraw the rejection of claims 1-11 over Chuang et al.

Furthermore, paragraph [0086] does not disclose that "a pupil image corresponding to each of the plurality of openings in the aperture layer is formed at the image plane when radiation from the illumination source passes through the reticle, the diffuser, the aperture layer and the projection lens system", and does not disclose "the pupil image having a projection lens pupil transmission distribution", as recited in claim 1. There is no indication that such is present in [0086] of Chuang et al. and the Examiner has not identified such. Thus, for this reason alone, Applicants submit that the Examiner has failed to state a *prima facie* case of anticipation, since one of the claimed elements appears to be wholly missing from the reference.

Accordingly, Applicants request the Examiner to withdraw the rejection of claims 1-11 over Chuang et al.

Paragraph [0182] does not appear relevant, and the only other disclosure of Chuang et al. relied upon by the Examiner is [0086]. [0086] refers to Figs. 1B, 1C and 1D of Chuang et al. Thus, if [0086] and Figs. 1B, 1C and 1D of Chuang et al. fail to disclose each and every limitation of claims 1-11, there can be no anticipation thereby. Applicants respectfully submit that [0086] and Figs. 1B, 1C and 1D of Chuang et al. in fact fail to disclose each and every limitation of claims 1-11, and therefore there is no anticipation by Chuang et al. Accordingly, the rejections on this ground should be withdrawn.

Paragraph [0086] of Chuang et al. is reproduced below for convenience:

[0086] FIGS. 1B, 1C, and 1D are conceptual system arrangements that may be employed in accordance with the current objective. FIG. 1B is a general illumination system having a light source 121, collection optics 122, beam shaping and uniformity elements 123, relay optics 124, and the sample 125. FIG. 1C illustrates a lamp based illumination system having a lamp 126, which may be an arc lamp or excimer lamp, collection optics 127 which may be refractive, reflective (ellipse or parabola), or catadioptric, beam shaping

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elements 128, including a light pipe, lens array, or axicon, and relay optics 129, potentially including pupil plane relay optics such as apertures or field plane optics such as field size limiters. Sample 130 receives light energy in this lamp based illumination system. FIG. 1D shows a laser based illumination system, with laser 111 being potentially solid state, gas, or excimer based. Collection optics 112 may include a simple beam waist arrangement or aperture relay. Beam shaping and uniformity elements 113 may include a diffuser or diffractive optic such as light shaping elements in the pupil or field plane. Relay optics 114 potentially include pupil plane relay optics such as apertures or field plane optics such as field size limiters. The elements shown and listed in FIGS. 1b, 1C, and 1D are meant to be examples, and other elements besides those listed may be employed. For example, and not by way of limitation, elements beyond a diffuser and diffractive optic may be used for beam shaping in the laser based illumination system of FIG. 1D.

Specifically, Fig. 1B includes a light source 121, collection optics 122, beam shaping and uniformity elements 123, relay optics 124, and the sample 125. There is no reticle, no aperture layer, and no diffuser. This fails on its face to anticipate claims 1-11.

Fig. 1C includes a lamp 126, collection optics 127, beam shaping elements 128, including a light pipe, lens array, or axicon, and relay optics 129, potentially including pupil plane relay optics such as apertures or field plane optics such as field size limiters. There is no reticle, and no diffuser. This fails on its face to anticipate claims 1-11.

Fig. 1D includes a laser illumination source, and collection optics 112, which may include a simple beam waist arrangement or aperture relay. Also included are beam shaping and uniformity elements 113, which may include a diffuser or diffractive optic such as light shaping elements in the pupil or field plane. Also included are relay optics 114, which may include pupil plane relay optics such as apertures or field plane optics such as field size limiters. While Fig. 1D may include a diffuser and apertures in the pupil plane, Fig. 1D does not show a transmissive reticle. In addition, the text in [0086] relating to Fig. 1D does not disclose a pupil image corresponding to each of the plurality of openings in the aperture layer formed at the image plane, as discussed above.

Thus, Applicants submit that the Examiner has failed to state a *prima facie* case of anticipation, since one or more of the claimed elements appears to be wholly missing from

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the reference and the Examiner has not identified where the missing elements may be found.

Accordingly, Applicants respectfully request the Examiner to withdraw the rejection of claims 1-11 over Chuang et al. Applicants respectfully submit that the claims 1-11 are not anticipated by Chuang et al. and that these claims are allowable thereover.

Conclusion

Applicants respectfully submit that all of claims 1-20 are in condition for allowance. Appropriate notice to such effect is respectfully requested.

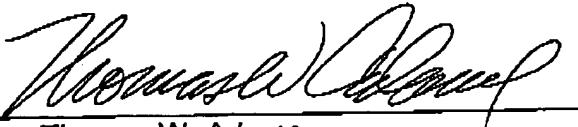
In the event issues arise as a result of the filing of this paper, or remain in the prosecution of this application, Applicants request that the Examiner telephone the undersigned attorney to expedite allowance of the application. Should a Petition for Extension of Time be necessary for the present Reply to the outstanding Office action to be timely filed (or if such a petition has been made and an additional extension is necessary) petition therefor is hereby made and, if any additional fees are required for the filing of this paper, the Commissioner is authorized to charge those fees to Deposit Account #18-0988, Docket No. H01541/AMDSPH1541.

Respectfully submitted,

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